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(54) **Insect resistant plants.**

(57) A method for introducing expressible insecticidal protein structural genes into plant genomes is provided. In the preferred embodiments this invention comprises placing a structural gene for the *Bacillus thuringiensis* crystal protein under control of a plant or a T-DNA promoter and ahead of a poly-adenylation site followed by insertion of said promoter/structural gene combination into a plant genome by utilizing a *Agrobacterium tumefaciens* Ti plasmid-based transformation system. The modified Ti plasmid is then used to transform recipient plant cells. Also provided are the plants and tissues produced by this method and bacterial strains, plasmids, and vectors useful for execution of this invention.

plant or T-DNA

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will be readily apparent to those skilled in the art. The invention in principle applies to any introduction of an insecticide structural gene into any plant species into which foreign DNA (in the preferred embodiment T-DNA) can be introduced and in which said DNA can remain stably replicated. In general these taxa presently include, but are not limited to, gymnosperms and dicotyledenous plants, such as sunflower (family Compositeae), tobacco (family Solanaceae), alfalfa, soybeans and other legumes (family Leguminoseae), cotton (family Malvaceae), and most vegetables. Pests which may be controlled by means of the present invention and the crops that may be protected from them include, but are not limited to, those listed in Tables 1 and 2, respectively. Because of its susceptibility to a number of larvae, cotton is an ideal choice for the insertion of an insecticidal protein gene. Each of the following is a major cotton pest and is also susceptible to the *B. thuringiensis* insecticidal protein: *Heliothis zea* (cotton bollworm), *Pectionophora gossypiella* (pink bollworm), *Heliothis virescens* (tobacco budworm), *Trichoplusia ni* (cabbage looper). Application of insecticidal protein prepared from sporulating *B. thuringiensis* does not control insects such as the pink bollworm in the field because of their particular life cycles and feeding habits. A plant containing in its tissues insecticidal protein will control this recalcitrant type of insect, thus providing advantage over prior insecticidal uses of *B. thuringiensis*. By incorporation of the insecticidal protein into the tissues of a plant, the present invention additionally provides advantage over such prior uses by eliminating instances of nonuniform application and the costs of buying and applying insecticidal preparations to a field. Also, the present invention eliminates the need for careful timing of application of such preparations since small larvae are most sensitive to insecticidal protein and the protein is always present, minimizing crop damage that would otherwise result from preapplication larval foraging.

TABLE 2

Plants recommended for protection by B. thuringinensis insecticidal protein

alfalfa	escarole	potatoes
almonds	field corn	radishes
apples	filberts	rangeland
artichokes	flowers	raspberries
avocados	forage crops	safflower
bananas	forest trees	shade trees
beans	fruit trees	shingiku
beets	garlic	small grains
blackberries	grapes	soybeans
blueberries	hay	spinach
broccoli	kale	squash
brussels sprouts	kiwi	stonefruits
cabbage	kohlrabi	stored corn
caneberries	lentils	stored grains
carrots	lettuce	stored oilseeds
cauliflower	melons	stored peanuts
celery	mint	stored soybeans
chard	mustard greens	stored tobacco
cherries	nectarines	strawberries
chinese cabbage	onions	sugarbeets
chrysanthemums	oranges	sugar maple
citrus	ornamental trees	sunflower
collards	parsley	sweet corn
cos lettuce	pasture	sweet potatoes
cotton	peaches	tobacco
cranberries	peanuts	tomatoes
crop seed	pears	turf
cucumbers	peas	turnip greens
currants	pecans	walnuts
dewberries	peppers	watermelons
eggplant	pome fruit	
endive	pomegranite	